

Application No. 10/708,020  
Technology Center 1775  
Preliminary Amendment dated December 5, 2006  
Submission Accompanying RCE under 37 CFR §1.114

### REMARKS

In an Advisory Action dated November 28, 2006, the Examiner maintained rejections of claims 1-20 under 35 USC §§103 and 112. In response, Applicants have amended the claims as set forth above. More particularly:

Independent claims 1 and 17 have been amended to specify that the microstructure of the second ceramic layer (22) as being "characterized by irregular flattened grains and a degree of inhomogeneity and porosity," consistent with the description of as-deposited thermal (plasma) sprayed coatings in paragraph [0014] of Applicants' specification, and as recited in dependent claim 13 (now canceled without prejudice).

Independent claims 1 and 17 have been further amended to specify that the "sufficient" number of cracks is "at least twenty-five cracks per linear inch of surface thereof," which finds support in paragraph [0019] of Applicants' specification.

Applicants believe that the above amendments do not present new matter. Favorable reconsideration and allowance of claims 1-20 are respectfully requested in view of the above amendments and the following remarks.

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### **Rejection under 35 USC §112, Second Paragraph**

Remaining claims 1-12 and 14-20 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. The Examiner's concern was for the limitation in independent claims 1 and 17 that

the second ceramic layer [has] vertical microcracks that extend through the thickness of the second ceramic layer in an amount sufficient to cause the second ceramic layer to be more erosion resistant than the first ceramic layer.

In the Advisory Action, the Examiner explained that "an amount sufficient to" is not defined by the claims or the specification. In response, Applicants have amended claims 1 and 17 to omit the "sufficient to" limitation and instead define the amount of vertical microcracks as being "at least twenty-five cracks per linear inch of surface thereof," which is disclosed in paragraph [0019] of the specification as providing the claimed erosion resistance.

In view of the above, Applicants respectfully request withdrawal of the rejection under 35 USC §112, second paragraph.

### **Rejections under 35 USC §103**

Independent claims 1 and 17 and their remaining dependent claims 2-12, 14-16, and 18-20 were rejected under 35 USC §103(a) as being

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unpatentable over U.S. Patent No. 6,887,595 to Darolia et al. (Darolia) in view of U.S. Patent No. 4,377,371 to Wisander et al. (Wisander), and as being unpatentable over U.S. Patent No. 6,764,779 to Lui et al. (Lui) in view of Wisander. Applicants respectfully request reconsideration in view of the following comments.

Both Darolia and Lui teach TBC systems with partially-stabilized and fully-stabilized zirconia layers. However, neither Darolia nor Lui teach anything regarding the relative erosion resistances of these layers, and do not teach or suggest forming the outermost zirconia layer to have vertical microcracks. Furthermore, in contrast to Applicants claimed coating system, Lui teaches that the partially-stabilized zirconia layer defines the outermost layer of the TBC system.

Wisander was cited for disclosing an outermost zirconia layer containing "[v]ertical microcracks . . . generated in the coating by scanning a laser beam over the plasma-sprayed ceramic surface." However, Wisander's cracks are formed within "a thin, uniform, fused layer on top of the plasma-sprayed ceramic surface" (column 2, lines 57-58), described as initially being a "thin layer about 0.005 inch thick melted at the surface" (column 2, lines 59-60) that "forms a continuous dense layer on top of the plasma-sprayed ceramic substrate" (column 2, lines 60-62). As such, Wisander's "thin," "uniform,"

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"fused," "continuous," and "dense" layer has an entirely different microstructure than Applicants' outermost second ceramic layer, which is claimed to be in the "as-thermal sprayed condition to have a microstructure characterized by irregular flattened grains and a degree of inhomogeneity and porosity."

In view of the above, Applicants believe that Wisander cannot be said to supplement the teachings of either Darolia or Lui in order to arrive at Applicants' invention. Applicants therefore respectfully request withdrawal of the §103 rejections to the claims.

**Closing**

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

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Attachment: Request for Continued Examination (RCE) Transmittal (2 copies)